

ABSTRACT

An optical apparatus comprises an optical waveguide, a bottom surface and walls formed on a first substrate and defining a detection volume with an upper opening, and a photodetector active area formed on a photodetector substrate. The bottom surface may be provided with a reflective coating. The waveguide is positioned relative to the detection volume so that light emerging from an end face of the waveguide is received within the detection volume. The detector substrate is mounted on the first substrate so as to cover the upper opening of the detection volume with the active area exposed to the detection volume. The optical waveguide may be formed on the first substrate along with the detection volume, or the optical waveguide may be formed on a separate waveguide substrate, and the waveguide substrate assembled with the first substrate.